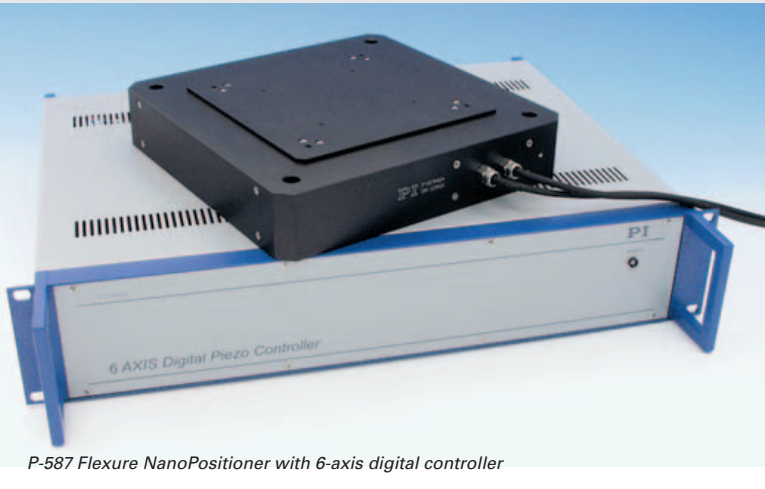


P-587

Long-Travel, 6-Axis, Single-Module Piezo Flexure NanoPositioner and Scanner



P-587 Flexure NanoPositioner with 6-axis digital controller

Application Examples

- Metrology
- Nanopositioning
- Semiconductor test equipment
- Precision mask and wafer alignment
- Scanning interferometry
- Surface structure analysis

Ordering Information

P-587.6CD
 6-Axis, Long-Travel Piezo Flexure Stage,
 800 × 800 × 200 μm × 3 × 3 × 10 mrad

**Custom Designs
 for Volume Buyers**

- For X Y Z $\theta_x \theta_y \theta_z$ Scanning and Positioning
- 800 × 800 × 200 μm Linear Range
- Up to 10 mrad Rotational Range
- Precision Trajectory Control
- Single-Module, Parallel-Kinematics Design features Enhanced Responsiveness and Automatic Runout Compensation
- Capacitive Sensors for Ultra-High Resolution
- ID Chip for AutoCalibration Function

P-587.6CD is a unique, highly accurate 6-axis scanning and positioning system, providing a linear travel range of 800 × 800 × 200 μm and rotation ranges of 10 mrad.

AutoCalibration

For optimized operation and interchangeability of the nanomechanics and controller, the P-587.6CD is equipped with an ID chip which holds all calibration data and sends it to the digital controller when powered up.

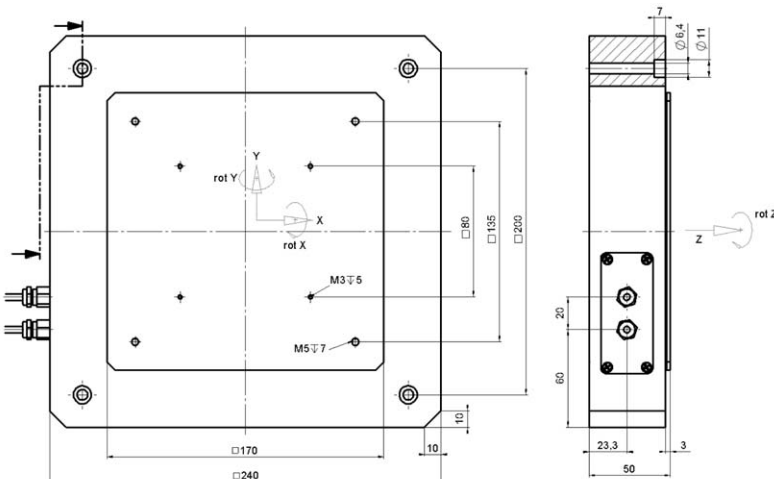
Parallel Kinematics

A major advantage of the single-module parallel-kinematics design is that there are no moving cables and no cable management issues to be resolved when integrating the unit. This design increases reliability enhances responsiveness and also increases repeatability and accuracy at the nanometer level, because the friction and force exerted by a moving cable are eliminated (see the "Tutorial" section, page 4-1 ff. for further details).

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Working Principle

Low-voltage PZTs (0 to 100 V) and flexures are employed as the drive and guiding system. The flexures provide zero stiction/friction, ultra-high resolution and exceptional guiding precision. Integrated capacitive position feedback sensors provide ultra-high resolution and stability in closed-loop operation (with PI electronics).



P-587 dimensions (in mm)

Technical Data

Models	P-587.6CD	Units	Notes see p. 2-44
Active axes	X Y Z $\theta_x \theta_y \theta_z$		
Closed-loop travel in XYZ ≥	800 × 800 × 200	μm	A5
Closed-loop travel in $\theta_x \theta_y \theta_z$ ≥	10	mrad	
Integrated feedback sensors	capacitive		B
Closed-loop resolution	10 ⁻⁵ x range		
Closed-loop linearity (typ.)	XY : 0.004% (30 nm) Z : 0.01% (20 nm) rotations: 0.2% (2 μrad)		
Max. (+/-) normal load	5	kg	D4
Electrical capacitance (XY)	2 x 51 /axis μF ±20%		F1
Electrical capacitance (Z)	4 x 5.4 μF	μF ±20%	
*Resonant frequency XY	103	Hz ±20%	G2
*Resonant frequency Z	150	Hz ±20%	G2
*Resonant frequency $\theta_x \theta_y$	308	Hz ±20%	G2
*Resonant frequency θ_z	244	Hz ±20%	G2
Cross Talk, all axes at full range <	1	μrad	
Operating temperature range	-20 to 80	°C	H2
Voltage /sensor connection	ID		J1/J2
Weight (without cables)	7.2	kg ±5%	
Body material	Al/Invar		L
Recommended Amplifier/Controller	E-710.6CD		

* at 600 g load